Lesson Answers

Unit A

Chemical Change

Chapter 1: Aqueous Solutions

Practice, page 8

2. a. 12

b. carbon

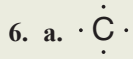
c. neutral

3. a. 17 protons

b. chlorine

c. 1-

Practice, page 10

6. a.  **b.** **c.**

d. **e.** **f.**

g. **h.**

Practice, page 31

24. a. ionic, electrolyte

b. ionic, electrolyte

c. ionic, electrolyte

d. molecular, non-electrolyte

e. ionic, electrolyte

f. ionic, electrolyte

Practice, page 35

26. b. 378

Practice, page 42

28. 43%

29. 1.2×10^{2} mL

30. 63 mL

Practice, page 44

31. a. 33.2 ppm

b. No

32. 4.54×10^{-4} g

33. 1.25×10^{-2} g

Practice, page 46

34. a. 2.18 mol/L

b. 0.843 mol/L

35. a. 0.513 mol

b. 0.642 mol/L

36. 0.417 mol/L

Practice, pages 50 and 51

37. a. 1000 mL

b. 6.41 mol/L

c. 36.0%

38. a. 65.7 L

b. 209 L

39. a. 4.17 L

b. 60 mL

1.5 Questions, page 52

6. a. 1.48 mol/L

b. 2.33×10^{5} ppm

c. 0.158 mol/L

d. 1.75 ppm

7. a. 0.160 L

b. 11.8%

c. 6.25 mol/L

Chapter 2: The Reduction and Oxidation of Metals

Practice, page 63

4. 0.133 mol

5. 1.45 mol

Practice, pages 64 and 65

7. a. 3.87 mol

8. a. 1.95 mol

b. 1.95 mol

9. a. 2.86×10^{-3} mol

b. 4.29×10^{-3} mol

c. 8.58×10^{-3} mol

d. 1.43×10^{-3} mol

10. a. 5.76×10^{-3} mol

b. 5.76×10^{-3} mol

2.1 Questions, page 68

5. a. 3.0×10^{3} mol

b. 4.5×10^{3} mol

c. 4.5×10^{3} mol

6. a. 2.8×10^3 mol

b. 3.5×10^3 mol

c. 4.2×10^3 mol

7. a. 54.0 mol

b. 54.0 mol

c. 54.0 mol

Practice, page 70

12. b. 7 350 000 t

13. a. 12.5 mol

b. 12.5 mol

Practice, page 72

15. a. silver

b. silver lost electrons

2.2 Questions, page 75

3. a. reduction

b. reduction

c. both

d. oxidation

e. oxidation

f. reduction

4. a. silver ion

b. zinc

c. nitrate ion

d. zinc

e. silver ion

f. nitrate ion

g. 2 electrons

h. 70.0 mol

5. a. iron

b. oxygen

c. 12 electrons

d. 95.3 mol

Practice, pages 82 and 83

28. $Ag^+(aq)$, $Sn^{2+}(aq)$, $Ni^{2+}(aq)$, $Cr^{2+}(aq)$, $Mg^{2+}(aq)$, $Li^+(aq)$

29. Ca(s), Zn(s), Fe(s), Cd(s), Sn(s), Pb(s), Cu(s)

Chapter 3: Organic Chemistry

Practice, page 110

1. a. 4 bonds

b. 2 bonds

c. 1 bond

d. 3 bonds

2. carbon

3. fluorine

4. b. 14

c. C_6H_{14}

5. a.

Practice, page 116

10. butane

Practice, pages 119 and 120

15. a. 2-methylbutane

b. 2,2-dimethylpropane

c. 3-methylpentane

d. 3,3-dimethylhexane

e. 3-methylhexane

f. 3-ethyl-3-methylhexane

g. 3-ethylhexane

h. 2,2,4-trimethylpentane

i. 4-methyl-4-propyloctane

j. 2,2,3-trimethylpentane

3.1 Questions, page 121

4. a. 2,2-dimethylpentane

b. 3-ethylhexane

c. 2,2,3,3-tetramethylbutane

d. 3-ethylhexane

e. 3-ethyl-4,5-dimethylheptane

f. 4,4-diethyloctane

Practice, page 129

28. a. 3-hexene

b. 3-ethyl-2-pentene

c. 2,3-dimethyl-2-pentene

d. 2-propyl-1-pentene

e. 4-ethyl-5-methyl-2-octyne

f. 3,6-dimethyl-4-octyne

Practice, page 132

33. a. hexane, pentane, propane

b. pentane, 1-pentene, 1-butene

c. 2-octene, 2-heptene, 2-hexene

Practice, page 133

34. a. 2-hexyne, 2-hexene, hexane

b. 2-butyne, ethene, propane

c. 3-octyne, 2-hexene, heptane

3.2 Questions, page 136

5. a. 5-methyl-3-heptyne

b. 3-ethyl-5-methyl-2-heptene

Practice, page 142

40. c. 76.25 mol

Unit B

Changes in Motion

Chapter 1: Describing Motion

Practice, page 169

1. a. 8×10^{1} km/h

b. 4.0 km/h

c. 4.4 km/h

2. a. 20 min

b. 13 km/h

3. motorist

Practice, page 170

4. all

Practice, page 171

5. a. thermometer, cereal box, soup can, radio, VCR

b. highway sign with arrows, Highway 33 marker

Practice, page 172

6. 8.2 km/h, 2.3 m/s

7. 343 m/s

8. 6.6 m/s, 24 km/h

1.1 Questions, page 173

2. a. 5.40×10^{3} s

b. 2.6×10^{6} s

c. 5.4×10^{8} s

3. a. 6.28×10^{-4} m

b. 1.3×10^{-3} m

c. 0.855 m

d. 2.85×10^{5} m

4. a. uniform motion

b. speed

c. 90.0 km/h

d. They are the same.

Practice, page 175

9. a. 17 m

b. 28 m

c. 44 m

d. 61 m

Practice, page 176

11. 4.6 h

12. 6.9 d

13. 18 h

1.2 Questions, pages 177 and 178

4. a. 13.38 m/s, 48.16 km/h

b. when turning, when speeding up or slowing down

c. 2.0 m

d. 29.9 s

Practice, page 180

14. a. 2.5 km[N], +2.5 km

b. 0.3 km[N], +0.3 km

c. 8.5 km[S], -8.5 km

Practice, page 181

15. a. 7.5 km[N], +7.5 km

b. 13.5 km[N], +13.5 km

c. 5.0 km[S], -5.0 km

d. 2.5 km[N] +2.5 km

Practice, page 184

17. a. 10.0 km[N], 5.0 km[S]

b. 5.0 km[N]

c. 5.0 km[N]

d. 2.1 km/h

e. 0.71 km/h[N]

18. 11 km[S], Nick Brook

1.3 Questions, page 185

2. a. 18.0 km[W], -18.0 km

b. 21.0 km[E], +21.0 km

c. 9.0 km[W], -9.0 km

d. 12.0 km[E], +12.0 km

3. a. 21.0 km[E]

b. 19.0 km/h, 7.00 km/h[E]

4. a. 9.0 km[W]

b. 14.0 km/h, 1.8 km/h[W]

5. a. 12.0 km[E]

b. Lake Trail

Practice, page 191

21. b. +1.0 mm/s

1.4 Questions, pages 192 and 193

3. b. +0.16 mm/s, -1.1 mm/s, -0.13 mm/s, +0.18 mm/s

4. b. -11 mm, 19 mm, 0, -5.2 mm

Practice, page 195

23. a. 10 m/s

b. 60 m

Practice, page 199

24. a. 8.3 mm/s^2

b. 3.8 cm/s^2

c. 2.8 m/s^2

d. 3.6 cm/s^2

Practice, page 200

25. 4.51 s

Practice, page 203

26. 285 km/h

27. a. -0.667 m/s^2

b. -0.70 cm/s^2

c. -0.65 mm/s^2

d. +0.53 m/s^2

28. 5.6 m/s^2[S]

1.5 Questions, page 204

3. a. 1.3 m/s^2

b. -2.0 m/s^2

c. 40 m

d. 25 m

Practice, page 206

31. a. +54.0 km/h, +108 km/h

b. 3.0 m/s^2

Practice, page 208

32. 91.7 m[E]

Practice, page 209

33. a. 1.48 s

b. 1.48 s

Practice, page 211

34. 2.0×10^2 m[E]

35. 60 m

1.6 Questions, pages 212 and 213

3. a. -2.50 m/s^2

b. 101 m

c. 101 m

e. 168 m

4. a. 1.94 s

b. 1.94 s

c. 19.1 m/s[up]

Practice, page 214

36. a. 0.214 s

b. 0.214 s

c. fatigue, impaired, distracted

Practice, page 216

38. a. 41.7 m, 65.9 m, 108 m

b. 33.3 m, 42.2 m, 75.5 m

Practice, page 218

39. a. 3.2 s

b. 3.6 s

40. a. increases

1.7 Questions, page 220

1. 1.5 s

2. uniform motion

3. decelerated or negatively accelerated motion

4. **a.** 43.8 m

b. 72.7 m

c. 116 m

d. 160 m

f. 214 m

Practice, page 226

45. **a.** $-2.226\ m/s^2$

b. 84.9 m

c. $-1.559\ m/s^2$

d. 121 m

1.8 Questions, page 227

1. **a.** single-rider sled

2. **a.** toboggan with all four braking

3. **b.** $2.0\ m/s^2[W]$

c. 3.7×10^2 N[W]

4. **a.** $4.1\ m/s^2[N]$

b. 10 m/s[S]

1.9 Questions, page 234

3. **a.** $3.68\ m/s^2[S]$

b. 4.90 s

Chapter 2: Collisions

Practice, page 244

1. 5.5 kg·m/s[N]

2. 15.0 m/s[E]

3. 0.14 kg

2.1 Questions, page 245

1. momentum

2. mass, velocity

3. 76.0 kg·m/s[N]

4. 9.41 m/s[E]

5. 0.16 kg

6. 8.89×10^5 kg·m/s[S]

8. no

Practice, page 247

4. **a.** 125 kg·m/s[down]

b. 125 kg·m/s[up]

c. 1.1×10^4 N[up]

5. 2.2×10^5 N[backward]

6. 19 N[backward]

Practice, page 251

7. **a.** 0.22 kg·m/s[backward]

b. 2.3 kg·m/s[backward]

8. **a.** 1.2×10^2 kg·m/s[forward]

b. 2.4×10^2 kg·m/s[forward]

2.2 Questions, page 251

2. **a.** momentum increases

b. momentum increases

3. 1.2×10^3 kg·m/s[backward]

4. 6.7 N[backward]

5. 0.18 s

6. **a.** 75 kg·m/s[forward]

b. 38 m/s[forward]

7. **a.** 62 N[backward]

b. 1.6×10^2 N[backward]

Practice, page 254

9. 4.8 N·s[forward]

10. 1.1×10^5 N·s[forward]

11. 4.8 N·s[backward]

12. 1.1×10^5 N·s[E]

2.3 Questions, page 256

2. change in momentum = impulse

3. impulse = $\vec{F}\Delta t$, impulse = $\vec{p}_f - \vec{p}_i$

5. **a.** 3.0×10^{-2} N·s[backward]

b. 0.63 N·s[backward]

6. **a.** 3.0×10^{-2} kg·m/s[backward]

b. 0.63 kg·m/s[backward]

7. **a.** 6.0 kg·m/s[E]

b. 5.2 kg·m/s[W]

c. 11.2 kg·m/s[W]

d. 11.2 N·s[W]

8. **a.** increases time, force is less

b. increases time, force is less

10. **a.** 0.90 N·s[backward]

b. 0.50 N·s[backward]

11. 75 N[backward], 42[backward]

2.4 Questions, pages 262 and 263

1. primary, secondary, tertiary

2. $\vec{F}_{1 \text{ on } 2} = -\vec{F}_{2 \text{ on } 1}$

5. a. +20 N, -20 N

b. +0.20 m/s^2, -0.25 m/s^2

c. +0.040 m/s, -0.050 m/s

d. +4.0 kg·m/s, -4.0 kg·m/s

e. +4.0 N·s, -4.0 N·s

Practice, page 270

17. a. 0.80 m/s[E]

b. +0.0090 kg·m/s, -0.0030 kg·m/s, +0.012 kg·m/s

18. 0.36 m/s[N]

19. 36 m/s[S]

Practice, page 271

20. a. hit and stick

b. 11 m/s[E]

c. 40 km/h[E]

d. yes

2.5 Questions, page 271

1. occurs along a straight line

2. hit and rebound, hit and stick, explosion

4. 12.0 m/s[E]

5. 12.7 m/s[E]

6. 44.0 km/h[E]

7. 4.5 m/s[E]

8. 66 kg

Practice, page 273

21. egg shell and yolk

Practice page, 277

23. a. 0.59 J

b. 0.59 J

c. 3.6 m/s

d. 0.33 kg·m/s[forward]

e. 0.33 kg·m/s[backward]

f. 0.33 kg·m/s[backward]

g. 8.2 N[backward]

h. 89 m/s^2[backward]

i. 8.2 N[backward]

24. a. 0.86 J

b. 0.86 J

c. 4.4 m/s

d. 0.39 kg·m/s[forward]

e. 0.39 kg·m/s[backward]

f. 0.39 kg·m/s[backward]

g. 9.7 N[backward]

h. 1.1 × 10^2 m/s^2[backward]

i. 9.7 N[backward]

2.6 Questions, page 281

2. 7.2 × 10^5 J

3. 7.3 × 10^5 J

4. 4.41 × 10^4 J

5. 40.0 J

Unit C

The Changing Earth

Chapter 1: The Abyss of Time

1.1 Questions, page 301

2. Slave River

Practice, page 303

4. 1.1 million years

1.2 Questions, page 305

4. single-celled bacteria

5. 3.8 billion years old

8. a. theory of Snowball Earth

Practice, page 310

11. lava younger than the road

Practice, page 310

13. a. layers S and Z

b. layers P and W

c. layer Q

1.3 Questions, page 313

3. Precambrian, Paleozoic, Mesozoic, and Cenozoic

4. a. Precambrian 87%, Paleozoic 8%, Mesozoic 4%, Cenozoic 1%

7. periods

8. Triassic Period

9. Holocene Epoch

10. Quaternary Period

Practice, page 316

14. layer F

15. layer B

17. unconformity

18. erosion

1.4 Questions, page 318

6. J, I, H, G, and E—oldest to youngest

8. layer I; trilobite fossils match

Practice, page 323

21. 2.9×10^9 a

22. 4.4×10^9 a

23. approximately 90%

Practice, page 324

24. 5.2×10^3 a

1.5 Questions, page 324

4. carbon-14 dating

5. a. younger than 77 million years and older than 74 million years

b. younger than 74 million years

c. dinosaur date

Chapter 2: A Tropical Alberta

Practice, page 331

6. uniformitarianism

Practice, page 334

9. a. eroding Precambrian rock

2.1 Questions, page 335

2. a. life Æ death Æ burial Æ preservation Æ discovery Æ recovery

4. Cambrian Explosion—2.0×10^7 a

Earth's History—4.5×10^9 a

Percentage for Cambrian Explosion—0.44%

Practice, page 337

11. 60 million years

2.2 Questions, page 342

3. a. crude oil, shale, sandstone, limestone

2.3 Questions, page 351

2. surface wave

4. about 20 km directly west of the Queen Charlotte Islands

5. 6.4 or 6.5

7. a. August 22, 1949

b. 8.1

Practice, page 356

19. no

Practice, page 357

24. b. deep impact theory and volcanic eruption theory

Practice, page 359

25. b. uniformitarianism

Chapter 3: Changing Climates

Practice, page 371

4. African savanna

3.1 Questions, page 374

4. Cretaceous Extinction

6. Tertiary and Quaternary

7. more than 97%

9. more rounded, V-shaped valleys

11. small flying dinosaurs and mammals

3.2 Questions, page 381

2. 99.4%

3. cold, with repeated glaciations

4. large and, in some cases, very woolly

11. cirque carved out by mountain glacier

3.3 Questions, page 389

4. change

Unit D

Changes in Living Systems

Chapter 1: The Biosphere of LIfe

Practice, pages 406 and 407

1. biotic factors

2. a. biotic factor

b. abiotic factor

Practice, page 414

9. dinosaurs

Practice, page 416

15. provide essential nutrients

Practice, page 418

19. a. mutualism

b. parasitism

c. commensalism or mutualism

20. probably commensalism

1.2 Questions, page 422

4. mutualism

5. competition

6. parasitism

Practice, page 432

28. a. algae

b. snails, waterfleas, mosquito larvae, and tadpoles

c. dragonfly larvae and stickleback

d. giant water bug, grebe, perch, frog, northern pike

29. c. tertiary consumers

1.3 Questions, page 432

2. 10%

5. producers

6. c. outside the pyramid

Practice, page 447

41. light energy from the Sun

Chapter 2: Changing Populations

Practice, page 480

4. b. about 50%

d. approximately 60 000 jobs

Practice, page 484

7. d. looks like the letter J

8. every 20 minutes

9. 6.9×10^{10} bacteria

Practice, pages 484 and 485

12. a. should increase

b. should decrease

c. should not change

13. open population

14. increase of five individuals

15. a. 15 individuals

b. five additional individuals each year

16. 150

17. not an example

Practice, page 485

18. invasive species

2.3 Questions, page 487

5. a. closed

b. approximately ten adult sea monkeys

c. space in tank; the amount of food available

d. Move sea monkeys into a bigger tank.

Practice, page 489

25. a closed population

Practice, page 493

27. 2400 new snails

28. a. 5000 snails

Practice, page 494

29. a. unbanded snail

b. banded snail

30. Snails have two bands.

31. d. disadvantage

32. d. advantage

2.4 Questions, page 496

3. mutations

Practice, page 498

33. mutations

34. d. adaptation

Practice, page 501

40. a. Lamarck's

Practice, page 503

42. a gene mutation

45. no increase in black colour

46. yes